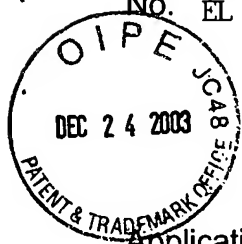


Express Mail Label  
No. EL 998651100 US

SMX 3160 (99-60R1)  
PATENT



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of M. Devenney et al.  
Serial No. 10/032,308  
Filed December 21, 2001  
Confirmation No. 9659

Art Unit 1755

For METHOD FOR PREPARING A CsX PHOTOSTIMULABLE  
PHOSPHOR AND PHOSPHOR SCREENS THEREFROM

Examiner Carol M. Koslow

**DECLARATION OF CASPER REAVES UNDER 37 CFR §1.132**

TO THE ASSISTANT COMMISSIONER FOR PATENTS,  
Washington, D.C. 20231

SIR:

I, Casper Reaves, declare as follows:

1. I am a former employee of Symyx Technologies, Inc., the co-assignee of the present patent application.
2. I, along with Martin Devenney (of Symyx Technologies, Inc.), Paul Leblans and Luc Struye (both of Agfa-Gevaert, N.V.), are named as joint inventors in the present application.
3. I am also a joint inventor, along with Martin Devenney, Paul Leblans and Luc Struye, in the following U.S. Patent Nos.:

6,528,812;	6,512,240;
6,504,169;	6,501,088;
6,495,850;	6,479,835;

as well as in published U.S. Patent Application 2003/0104121.

4. I make this Declaration based upon personal knowledge of the facts surrounding the invention of the subject matter claimed in the present application and the attribution of the subject matter disclosed in the above-referenced U.S. Patents and published U.S. Patent Applications, as well as published U.S. Patent Applications 2001/0007352 (abandoned) and 2003/0091729 (divisional of Application 2001/0007352).

5. I, along with Martin Devenney, Paul Leblans and Luc Struye, conceived of the invention defined by currently pending claims 1-18 and 20-34 of the present application, as part of a collaboration which was initiated by a proposal from the Agfa-Gevaert, N.V. inventors that Symyx Technologies, Inc. investigate cesium-halide phosphors generally, including for example CsBr. From this initial proposal, we succeeded in developing and preparing the methods and materials now being claimed. *Inter alia*, we jointly identified that cesium halides doped with europium halides are effective as potential X-ray storage phosphors.

6. To the extent that any of the above-noted U.S. Patents and/or published U.S. Patent Applications disclose the following, this disclosure constitutes a publication of the work of Martin Devenney, Paul Leblans, Luc Struye and myself: (i) a binderless phosphor screen comprising a CsX:Eu phosphor, wherein X is Cl or Br, produced by mixing CsX with  $10^{-3}$  to 5 mol% of an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I; firing this mixture at a temperature about  $450^\circ\text{C}$ ; cooling and recovering the phosphor; (ii) producing a binderless phosphor screen by applying the phosphor produced by the process of (i) to a substrate by a method selected from chemical vapor deposition or physical vapor deposition; (iii) producing a binderless phosphor screen by bringing (a) heatable multiple containers of CsX and an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I, or (b) a single container comprising a mixture of CsX and an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I, into a deposition chamber with a substrate and depositing the mixtures on the substrate by a method selected from chemical vapor deposition or physical vapor deposition; (iv) a phosphor characterized by the formula CsX:Eu, wherein X is selected from the group consisting of Br, Cl and combinations thereof, said phosphor exhibiting, when excited with radiation of 254 nm, a blue photoluminescence and a red photoluminescence wherein said blue photoluminescence has an power (Watt) at least 100 times higher than said

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PATENT

red photoluminescence; and, (v) a process of stimulating a binderless storage phosphor screen comprising a CsX:Eu phosphor, wherein X is Cl or Br, produced by the process of (i), wherein the phosphor has radiation stored therein.

7. All statements that I have made herein of my own knowledge are true and all statements made on information and belief are believed to be true. I acknowledge that willfully making false statements is punishable by fine, imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of any patent issuing from this application.

2 DECEMBER 2003

Date

Casper Reaves

Casper Reaves



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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of M. Devenney et al.  
Serial No. 10/032,308  
Filed December 21, 2001  
Confirmation No. 9659

Art Unit 1755

**RECEIVED**  
**JAN 12 2004**  
**TC 1700**

For **METHOD FOR PREPARING A CsX PHOTOSTIMULABLE  
PHOSPHOR AND PHOSPHOR SCREENS THEREFROM**

Examiner Carol M. Koslow

**DECLARATION OF MARTIN DEVENNEY UNDER 37 CFR §1.132**

TO THE ASSISTANT COMMISSIONER FOR PATENTS,  
Washington, D.C. 20231

SIR:

I, Martin Devenney, declare as follows:

1. I am an employee of Symyx Technologies, Inc., the co-assignee of the present patent application.
2. I, along with Casper Reaves (formerly of Symyx Technologies, Inc.), Paul Leblans and Luc Struye (both of Agfa-Gevaert, N.V.), are named as joint inventors in the present application.
3. I am also a joint inventor, along with Casper Reaves, Paul Leblans and Luc Struye, in the following U.S. Patent Nos.:

6,528,812;	6,512,240;
6,504,169;	6,501,088;
6,495,850;	6,479,835;

as well as in published U.S. Patent Application 2003/0104121.

4. I make this Declaration based upon personal knowledge of the facts surrounding the invention of the subject matter claimed in the present application and the attribution of the subject matter disclosed in the above-referenced U.S. Patents and published U.S. Patent Applications, as well as published U.S. Patent Applications 2001/0007352 (abandoned) and 2003/0091729 (divisional of Application 2001/0007352).

5. I, along with Casper Reaves, Paul Leblans and Luc Struye, conceived of the invention defined by currently pending claims 1-18 and 20-34 of the present application, as part of a collaboration which was initiated by a proposal from the Agfa-Gevaert, N.V. inventors that Symyx Technologies, Inc. investigate cesium-halide phosphors generally, including for example CsBr. From this initial proposal, we succeeded in developing and preparing the methods and materials now being claimed. *Inter alia*, we jointly identified that cesium halides doped with europium halides are effective as potential X-ray storage phosphors.

6. To the extent that any of the above-noted U.S. Patents and/or published U.S. Patent Applications disclose the following, this disclosure constitutes a publication of the work of Casper Reaves, Paul Leblans, Luc Struye and myself: (i) a binderless phosphor screen comprising a CsX:Eu phosphor, wherein X is Cl or Br, produced by mixing CsX with  $10^{-3}$  to 5 mol% of an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I; firing this mixture at a temperature about  $450^\circ\text{C}$ ; cooling and recovering the phosphor; (ii) producing a binderless phosphor screen by applying the phosphor produced by the process of (i) to a substrate by a method selected from chemical vapor deposition or physical vapor deposition; (iii) producing a binderless phosphor screen by bringing (a) heatable multiple containers of CsX and an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I, or (b) a single container comprising a mixture of CsX and an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I, into a deposition chamber with a substrate and depositing the mixtures on the substrate by a method selected from chemical vapor deposition or physical vapor deposition; (iv) a phosphor characterized by the formula CsX:Eu, wherein X is selected from the group consisting of Br, Cl and combinations thereof, said phosphor exhibiting, when excited with radiation of 254 nm, a blue photoluminescence and a red photoluminescence wherein said blue photoluminescence has an power (Watt) at least 100 times higher than said red photoluminescence; and, (v) a process of stimulating a binderless storage phosphor

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screen comprising a CsX:Eu phosphor, wherein X is Cl or Br, produced by the process of (i), wherein the phosphor has radiation stored therein.

7. All statements that I have made herein of my own knowledge are true and all statements made on information and belief are believed to be true. I acknowledge that willfully making false statements is punishable by fine, imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of any patent issuing from this application.

10/21/03  
Date

  
Martin Devenney

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SMX 3160 (99-60R1)  
PATENT



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of M. Devenney et al.  
Serial No. 10/032,308  
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Art Unit 1755

For METHOD FOR PREPARING A CsX PHOTOSTIMULABLE  
PHOSPHOR AND PHOSPHOR SCREENS THEREFROM

Examiner Carol M. Koslow

RECEIVED  
JAN 12 2004  
TC 1700

DECLARATION OF LUC STRUYE UNDER 37 CFR §1.132

TO THE ASSISTANT COMMISSIONER FOR PATENTS,  
Washington, D.C. 20231

SIR:

I, Luc Struye, declare as follows:

1. I am an employee of Agfa-Gevaert, N.V., the co-assignee of the present patent application.
2. I, along with Martin Devenney (of Symyx Technologies, Inc.), Casper Reaves (formerly of Symyx Technologies, Inc.) and Paul Leblans (of Agfa-Gevaert, N.V.), are named as joint inventors in the present application.
3. I am also a joint inventor, along with Paul Leblans, Martin Devenney and Casper Reaves, in the following U.S. Patent Nos.:  
6,528,812; 6,512,240; 6,504,169;  
6,501,088; 6,495,850; 6,479,835;  
as well as in published U.S. Patent Application 2003/0104121.

4. I make this Declaration based upon personal knowledge of the facts surrounding the invention of the subject matter claimed in the present application and the attribution of the subject matter disclosed in the above-noted U.S. Patents and published U.S. Patent Applications.

5. I, along with Martin Devenney, Casper Reaves and Paul Leblans conceived of invention defined by currently pending claims 1-18 and 20-34 of the present application, as part of a collaboration which was initiated by a proposal from the Agfa-Gevaert, N.V. inventors that Symyx Technologies, Inc. investigate cesium-halide phosphors generally, including for example CsBr. From this initial proposal, we succeeded in developing and preparing the methods and materials now being claimed. *Inter alia*, we jointly identified that cesium halides doped with europium halides are effective as potential X-ray storage phosphors.

6. To the extent that any of the above-noted U.S. Patents and/or published U.S. Patent Applications disclose the following, this disclosure constitutes a publication of the work of Martin Devenney, Casper Reaves, Paul Leblans and myself: (i) a binderless phosphor screen comprising a CsX:Eu phosphor, wherein X is Cl or Br, produced by mixing CsX with  $10^{-3}$  to 5 mol% of an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I; firing this mixture at a temperature about 450EC; cooling and recovering the phosphor; (ii) producing a binderless phosphor screen by applying the phosphor produced by the process of (i) to a substrate by a method selected from chemical vapor deposition or physical vapor deposition; (iii) producing a binderless phosphor screen by bringing (a) heatable multiple containers of CsX and an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I, or (b) a single container comprising a mixture of CsX and an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I, into a deposition

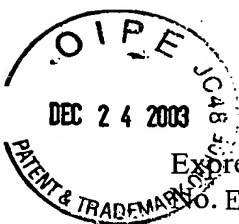


chamber with a substrate and depositing the mixtures on the substrate by a method selected from chemical vapor deposition or physical vapor deposition; (iv) a phosphor characterized by the formula  $\text{CsX:Eu}$ , wherein X is selected from the group consisting of Br, Cl and combinations thereof, said phosphor exhibiting, when excited with radiation of 254 nm, a blue photoluminescence and a red photoluminescence wherein said blue photoluminescence has an power (Watt) at least 100 times higher than said red photoluminescence; and, (v) a process of stimulating a binderless storage phosphor screen comprising a  $\text{CsX:Eu}$  phosphor, wherein X is Cl or Br, produced by the process of (i), wherein the phosphor has radiation stored therein.

7. All statements that I have made herein of my own knowledge are true and all statements made on information and belief are believed to be true. I acknowledge that willfully making false statements is punishable by fine, imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of any patent issuing from this application.

21-10-'03  
Date

Luc Struye  
Luc Struye



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Art Unit 1755

For METHOD FOR PREPARING A CsX PHOTOSTIMULABLE  
PHOSPHOR AND PHOSPHOR SCREENS THEREFROM

Examiner Carol M. Koslow

**DECLARATION OF PAUL LEBLANS UNDER 37 CFR §1.132**

TO THE ASSISTANT COMMISSIONER FOR PATENTS,  
Washington, D.C. 20231

SIR:

I, Paul Leblans, declare as follows:

1. I am an employee of Agfa-Gevaert, N.V., the co-assignee of the present patent application.
2. I, along with Martin Devenney (of Symyx Technologies, Inc.), Casper Reaves (formerly of Symyx Technologies, Inc.) and Luc Struye (of Agfa-Gevaert, N.V.), are named as joint inventors in the present application.
3. I am also a joint inventor, along with Luc Struye, Martin Devenney and Casper Reaves, in the following U.S. Patent Nos.:

6,528,812;	6,512,240;	6,504,169;
6,501,088;	6,495,850;	6,479,835;

as well as in published U.S. Patent Application 2003/0104121.

4. I am also named as a joint inventor, along with Eric Hell, Manfred Fuchs, Detlef Mattern, and Bernhard Schmitt, in published U.S. Patent Applications 2001/0007352 (abandoned) and 2003/0091729 (divisional of Application 2001/0007352).

5. I make this Declaration based upon personal knowledge of the facts surrounding the invention of the subject matter claimed in the present application and the attribution of the subject matter disclosed in the above-noted U.S. Patents and published U.S. Patent Applications.

6. I, along with Martin Devenney, Casper Reaves and Luc Struye, conceived of the invention defined by currently pending claims 1-18 and 20-34 of the present application, as part of a collaboration which was initiated by a proposal from the Agfa-Gevaert, N.V. inventors that Symyx Technologies, Inc. investigate cesium-halide phosphors generally, including for example CsBr. From this initial proposal, we succeeded in developing and preparing the methods and materials now being claimed. *Inter alia*, we jointly identified that cesium halides doped with europium halides are effective as potential X-ray storage phosphors.

7. To the extent that any of the above-noted U.S. Patents and/or published U.S. Patent Applications disclose the following, this disclosure constitutes a publication of the work of Martin Devenney, Casper Reaves, Luc Struye and myself: (i) a binderless phosphor screen comprising a CsX:Eu phosphor, wherein X is Cl or Br, produced by mixing CsX with  $10^{-3}$  to 5 mol% of an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein X' is F, Cl, Br or I; firing this mixture at a temperature about 450EC; cooling and recovering the phosphor; (ii) producing a binderless phosphor screen by applying the phosphor produced by the process of (i) to a substrate by a method selected from chemical vapor deposition or physical vapor deposition; (iii) producing a

binderless phosphor screen by bringing (a) heatable multiple containers of CsX and an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein  $\text{X}'$  is F, Cl, Br or I, or (b) a single container comprising a mixture of CsX and an europium compound selected from  $\text{EuX}'_2$ ,  $\text{EuX}'_3$  and  $\text{EuOX}'$ , wherein  $\text{X}'$  is F, Cl, Br or I, into a deposition chamber with a substrate and depositing the mixtures on the substrate by a method selected from chemical vapor deposition or physical vapor deposition; (iv) a phosphor characterized by the formula  $\text{CsX:Eu}$ , wherein X is selected from the group consisting of Br, Cl and combinations thereof, said phosphor exhibiting, when excited with radiation of 254 nm, a blue photoluminescence and a red photoluminescence wherein said blue photoluminescence has an power (Watt) at least 100 times higher than said red photoluminescence; and, (v) a process of stimulating a binderless storage phosphor screen comprising a  $\text{CsX:Eu}$  phosphor, wherein X is Cl or Br, produced by the process of (i), wherein the phosphor has radiation stored therein.

8. All statements that I have made herein of my own knowledge are true and all statements made on information and belief are believed to be true. I acknowledge that willfully making false statements is punishable by fine, imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of any patent issuing from this application.

21-6-03  
Date

Paul Leblans  
Paul Leblans